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Enlistment standards for two Navy ratings: boiler technicians (BT) and machinist mates (MM)

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THESIS

ENLISTMENT STANDARDS FOR TWO NAVY RATINGS: BOILER TECHNICIANS (BT) AND MACHINIST MATES (MM)

by

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June 1983

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I. INTRODUCTION

A. BACKGROUND

Why is there a need to develop enlistment standards for Machinist Mates and Boiler Technicians?

On the average, in paygrades E-1 through E-9, serving on active duty in the United States Navy, there are approximately 28,000 Machinist Mates (including nuclear qualified) and 11,000 Boiler Technicians. [Ref. 1] These figures reflect only those designated in each rating. In addition, the Navy carries a large inventory of potential strikers for each rating. These inventories include 5500 Fireman Recruits (FR), 6500 Fireman Apprentice (FA) and 7500 Fireman (FN). [Ref. 1]

Using Navy personnel inventory data, the authors determined that the rated Boiler Technicians and Machinist Mates plus the non-designated pool account for about 12.5 percent of the entire enlisted force in the United States Navy. Individually, Machinist Mates are the largest Navy rating while Boiler Technicians rank as the ninth largest rating. [Ref. 1]

These two ratings are closely aligned in what they do and the environment in which they work. Both work within the hull of a ship in enginerooms and firerooms that are located below the ships water line. The working conditions

are often times hot and noisy, and the tasks physically demanding. These job characteristics, combined with working environment, place a high degree of stress upon the individual. During normal career growth, a Boiler Technician will spend about 65 percent of his time assigned to fleet units, while Machinist Mates will spend about 70 percent of their time with fleet units.

Based on rating size, work environment and time spent on fleet units, it can be seen that the investment and concern for these two ratings is substantial. Historically, these two ratings have had low retention and reenlistment rates. As a result, for recruiters, there has been a continuing need to recruit new enlistees who can become 'QUALIFIED' Machinist Mates and Boiler Technicians and so maintain an adequate inventory in these ratings.

B. OBJECTIVES

The purpose of this thesis is to develop a model to assist recruiters in placing enlistees in a rating for which they are best 'QUALIFIED', and to provide recruiters a tool to predict the likelihood of an enlistee doing 'WELL' during his enlistment.

C. SAMPLE SELECTION

The data base for this thesis consists of the records of 206,229 non-prior service males who enlisted for active

duty in the United States Navy between Spetember 1976 and December 1978. All records were kept updated through September 1982.

From the data base, the records of 5511 Boiler Technicians and 10545 Machinist Mates were extracted. A further breakdown was performed to segregate nuclear and non-nuclear qualified Machinist Mates. The frequency distribution included 5969 non-nuclear qualified MM's and 4576 nuclear qualified MM's. For the purposes of this thesis, nuclear qualified personnel will not be included in the analysis. Criterion and predictor variables chosen by the authors were extracted from the same data base.

D. ORGANIZATION

Chapter I is an introduction which states the background, objectives, sample selection and organization of the research.

Chapter II presents a historical perspective of related research.

Chapter III discusses establishment and manipulation of the data base and variables used in the model.

Chapter IV develops the analysis of each rating and model formulation.

Chapter V draws conclusions and recommendations based on the analysis.

II. HISTORICAL PERSPECTIVE

A. INTRODUCTION

Current enlistment standards are partly based on the survivability of recruits in their first term. Most studies focus on this issue. The purpose of this chapter is to review some of the pertinent research efforts that relate enlistment standards to job performance, enlistment, attrition and retention. Highlighted will be the relationships between criterion and predictor variables.

B. RESEARCH WORKS EMPHASISING SURVIVAL

Lurie (CNA 1981) conducted analyses which related advancement and survival to AFQT score (Converted to FY81 AFQT Norms), age, primary dependents and years of education of enlistees. AFQT was subdivided into sets of high and low scores for each rating. All recruits were considered to be 19 years old with no dependents. Educational level was divided into high school and non-high school graduate. For this study, he chose two distinct ratings: Ships Serviceman (SH) and Electronics Technician (ETN).

The data base was a 1973 recruit cohort of non-prior service males which had been kept current through 1977. In his sample were 217 SH's and 1195 ETN's. The enlisted master records (EMR) provided the most recent paygrade

information and all previous promotions and/or demotions. Lurie used a MARKOV process to develop his model which he refered to as the 'ADVANCEMENT MODEL.' The model required estimates of transactions from any paygrade (promotion, demotion or attrition). The estimation of time spent in any paygrade until the next transition was described by the use of a logit model. From this he developed logit coefficients for paygrades E-1 to E-4. He concluded that for SH's, educational level had the greatest impact on advancement. However, for high school graduates AFQT had only a slight effect on chances for advancement. For non-high school graduates recruits with lower scores outperformed those with higher scores. They advanced more quickly to E-3 and E-4. A more interesting observation was that recruits with higher AFQT scores stand a greater chance (higher probability) of being reduced from E-2 to E-1. Lurie recommended that non-high school graduates who score high on AFQT should be assigned to other ratings.

For ETN's high school graduates with higher AFQT's performed only slightly better than those with lower scores. There was almost no difference in performance between AFQT groups among non-high school graduates. For this rating AFQT was of little importance in predicting advancement. Lurie implied that the relevant range of scores was too narrow (all high) to be used reliably as a predictor for ETN's.

Fletcher (CNA 1979), using a 1973 cohort, reported an investigation of factors affecting first term survival and retention behavior of Machinist Mates and Boiler Technicians. The data base used included only men with at least six months of service and followed them a period of four years. The sample size for checking survival odds included 1729 Boiler Technicians and 2714 Machinist Mates. The variables used were: Dependents, age, years of education and AFQT score. As indicated by AFQT scores, Machinist Mates were of higher mental quality than the BT's, primarily due to the fact that nuclear qualified personnel were not excluded from the MM's. It was found that sixteen percent of Machinist Mates and one percent of Boiler Technicians were in the upper mental group. Six percent of Machinist Mates and twenty-two percent of Boiler Technicians had less than eleven years of education. The most significant back-groud variable for Boiler Technicians was education. For example, having eleven years or less of education greatly lowered the probability that the individual would survive their initial enlistment. While more than twelve years increased this probability. For Machinist Mates, men in the highest and lowest mental groups had greater survival probability than others. Also, six year obligors in the Machinist Mate rating had a six percent greater chance of survivability than four year obligors. For both ratings, older men had a higher probability of survival. The same

variables were used in estimating probability of reenlistment. The sample size here included 1144 Machinist Mates (six year obligors were ommitted) and 905 Boiler Technicians. For Boiler Technicians, having a dependent was associated with an increased reenlistment probability. The most interesting finding was the low probability of reenlistment of Boiler Technicians with greater than twelve years of education. For Machinist Mates, having a dependent was associated with a dramatically increased probability of reenlistment. Education and AFQT had no significant relationship with reenlistment for Machinist Mates'.

Lurie (CNA 1981) explained the derivation of continuous survival curves through eight years of service for non-prior service male recruits. He predicted average survival times by education, mental group and age. The survival predictions developed were proposed for use in recruit screening. Findings showed that education proved the most significant factor. Interestingly, in the first four years of enlistment, individuals with a GED performed similiarly to non-high school graduates. However, after eight years of service and completion of 'A' school, the GED group's retention was markedly better than that of the non-high school graduates. This study indicated that there was little difference among the survival probabilities of the separate mental groups.

Thomason's (CNA 1979) study concerning first term survival and reenlistment chance was conducted on data

collected shortly after the advent of the all volunteer force. The sample was from calender year 1973 and included only first term males. The report dealt with a cross section and included 37 Navy ratings. There were no conclusive results related to specific ratings, since the recruit characteristics varied across ratings and no single rating was specifically analyzed. The significant characteristics predictive of the criteria were age and education level. However, in addition to these two predictors, participation in the delayed entry program (DEP) and location of recruit training had definite relationships to first-term retention. Of particular interest, in the 1973 cohort of 1729 individuals recruited as Boiler Technicians, only 53 percent, or 508, survived the initial enlistment. For Machinist Mates, of 2725 individuals, 64 percent survived. There was no mention of whether or not nuclear trainees were segregated from this group. It is also worthy of note that of the seventeen groups of ratings used, Boiler Technicians had the lowest probability of survival. Reenlistment for first term survivors turned out to be approximately 20 percent. The data also showed that Boiler Technicians 19-20 years of age at enlistment and Machinist Mates over 18 years old had a greater tendency to survive than did the younger recruits. The snapshot of the most likely Boiler Technician to survive was a non-caucasian who had no dependents upon enlistment, was in mental category one or two, had at least 12 years of

education and had served at sea on a carrier. Machinist Mates differed in that their best pattern for survival showed age greater than 18 years upon enlistment, non-caucasian, married and assigned to a submarine (nuclear trained).

Lurie (CNA 1982) used multiple regression techniques to estimate survival curves for non-prior service female recruits through eight years of service. A 1979 cross-sectional data base contained 30,000 women was used. Separate analyses were performed for 'A' school and non 'A' school attendees. Variables used included age, educational level and mental group. Results showed that educational level was the best predictor of survival. Women with a high school diploma survived longer than those with a GED. Survival across mental groups was constant for 'A' school attendees. Also, for 'A' school attendees, there was an increasing trend in survival for older women. Lurie determined the optimal recruiting age for these recruits was 22 years of age and older. Non 'A' school attendees showed a decreasing trend in survival as age increased. The optimal age of these recruits was determined to be between 17-22 years.

Sands (NPRDC 1977) looked at attrition of 68,616 non-prior service enlisted males who entered the Navy during 1973. He used this sample to develop a two year prediction model. Mental groups was one variable used along with education, age and number of dependents. His results

concluded that higher mental ability personnel exhibited higher survival rates, with one exception: Mental group IV personnel had higher survival rates than did mental group III recruits.

C. RESEARCH WORK UTILIZING 'SCREEN'

Lockman and Lurie (CNA 1980) developed a validity check of SCREEN (success chances of recruits entering the Navy) using a comparison between a 1977 recruit cohort and the initial 1973 screen cohort. screen, which is used in qualifying potential recruits for enlistment, is a table of success chances of completing the first year of service. SCREEN tables were developed based on grade of education, number of dependents, AFQT score and age. The sample size for 1977 included approximately 68,000 non-prior service United States Navy males, 15,000 male reservists and 4400 females. The initial screen cohort in 1973 contained 67,000 non-prior service (NPS) males. Using a regression technique, the two cohort groups were compared. Despite differences between 1973 and 1977 NPS cohorts such as: older recruit age, increased number of minorities, increased first year attrition and increased participation in DEP (delayed entry program), the relationships between recruit characteristics and first year survival were similiar. A general pattern developed when comparing all groups. As educational level and AFQT declined, the chance of survival declined. The main

difference between 1973 and 1977 screen groups was that success chances of recruits with dependents were greater, rather than less, than those without dependents. Men with dependents in the 1977 cohort showed a higher (by 11%) first year survival rate than did those with dependents in the 1977 cohort.

D. RESEARCH WORK CENTERED ON PRODUCTIVITY

Horowitz and Sherman (CNA 1977) reported on the productivity of enlisted personnel aboard ships, as a function of personal characteristics. Their premise was that ship readiness is measured by material condition of the shipboard equipment. They looked at casualty reports (CASREPTS) from 91 cruisers, frigates and destroyers to determine how productivity of sailors varied with their education, entry test scores, paygrade, experience, training, race and martial status. Using multiple regression, they conducted analyses by rating and ship's subsystem. Engineering systems were divided into distinct groups: CG (CRUISER), DDG (GUIDED MISSILE DESTROYERS), DD (FORREST SHERMAN DESTROYERS (EXCEPT DD933)), DD (FRAM DESTROYERS), FF1040 (FAST FRIGATE), FFG1 (GUIDED MISSILE FRIGATE) AND FF1052 (FAST FRIGATE). The authors discovered that equipment complexity affected not only material condition, but also the effectiveness of the crew in maintaining the equipment. Crew quality, as measured by entry test scores, paygrade,

training and length of service, mattered much more on CG's, DDG's and FORREST SHERMAN DESTROYERS than on other classes of ships. It was estimated that an increase of one percentage point in the average shop practices test scores of BT's, on these three ships, would lower CASREPT downtime substantially. Also, a one percentage point drop in the fraction of BT's who were not rated was associated with a drop in equipment downtime. The report also indicated that married BT's were less productive than single BT's on these ships. Another interesting estimation was if 25 percent of the BT's attended one extra school, CASREPT downtime would fall dramatically. For Machinist Mates, experience was the most important characteristic, especially for those with three or more years in the Navy. Training was found to improve productivity, however, extra Machinist Mate schooling (off ship) increased equipment downtime.

E. SUMMARY

The research reviewed above indicated that the reliable predictors for retention and reenlistment include age, education level and ASVAB/AFQT scores. This thesis intends to used these predictors to predict 'SUCCESS' so that recruiters can estimate the probability of an enlistee being 'SUCCESSFUL' a major difference between this thesis and the studies discussed above is the development of the ASVAB subtests as individual predictors. In our literature

review, the only study in which a subtest was used as a predictor was that of Horowitz and Sherman (CNA 1977).

Although this literature review is by no means total in nature, it does represent a cross section of work conducted in the area of interest.

III. DATA BASE/VARIABLE DEFINITION

A. DATA FILES

Three data files were merged by social security number to create the file with which the thesis research was conducted.

1. Defense Manpower Data Center Cohort File

The DMDC file was developed by merging information from the Military Entrance Processing Station (MEPS). The DMDC file is updated every six months by the master/loss transaction file obtained from the Military Personnel Commands. The DMDC file contains approximately 150 individual variables. This file is kept on a fiscal year basis and contains file information dating back to 1971. There are approximately 450,000 cases per fiscal year. [Ref. 2]

2. Naval Enlisted Active Duty and Historical Cohort File

This file, maintained by the Navy Health Research Center (NHRC), San Diego, contains information on each enlisted member who has been or still is on active duty, from 1 January 1965 to the present date. The data base was compiled from the monthly Navy Military Personnel Center (NMPC) change tape extracts dating from 1 January 1965 to 30 June 1973, and from the NMPC monthly 'AMON' extracted tapes dating from 1 July 1973 to the present. It contains current cohort data from as far back as 1966. This data

base has approximately 2,500,000 cases, and is updated quarterly. Normally, it will track a member from the date of enlistment to the date of discharge. This file contains a large number of variables.

B. SELECTION OF CRITERION AND PREDICTOR VARIABLES

1. Criterion Variables

The process of determining the criterion variables for this thesis was clearcut and based on professional judgement. The authors wanted easily defineable and meaningful variables that the Navy, especially recruiters, understood. The criteria used are all of equal weight, with no one more relevant than another. The relevant criteria finally used include time to E-4, and recommended or not recommended for reenlistment. The analysis chapter steps through several approaches taken by the authors that led to the use of these variables. Data for the criterion variables were extracted from the Navy Health Research Center Cohort File (NHRC).

2. Predictor Variables

There was a whole host of possibilities to choose from to develop the explanatory variables. However, the authors wanted to use variables that were easily accessable and not subject to change (ie. dependent status, maritial status). Of primary concern here was the measure of individuals' qualities. To meet all the objectives, age, years of

education and the scores on the Armed Service Vocational Aptitude Battery (ASVAB) subtests were used as predictors. These variables were extracted from the Defense Manpower Data Center Cohort File (DMDC).

a. ASVAB Background

Since the Armed Services Aptitude Battery (ASVAB) subtests account for ten of the twelve predictor variables used, an explanation of their relevance is required. The ASVAB is given to all applicants who intend on enlisting in the service. In January 1976, the Department of Defense implemented the ASVAB to replace the aptitude test batteries that were then in use by each service. It was developed essentially to serve two purposes in the recruiting process. It was to determine eligibility for enlistment, and to be used as the determining factor in establishing qualifications for specific skills within the service. [Ref. 3] The minimums were set by each branch of service based on their experience on how people with different scores performed in a training environment. To measure accurately a variety of abilities, the Navy used ten subtests from ASVAB forms 5, 6 and 7, which were in use during September 1976 through December 1978. The subtests are shown in Table I. Three of the tests (word knowledge, arithmetic reasoning and space perception) were then used to determine the commonly used Armed Forces Qualification Test (AFQT) score, which places a recruit into a mental category (I through IV).

TABLE I

SUBTESTS IN ASVABS 5, 6 AND 7

MAXIMUM SCORE	SUBTEST
20	ARITHMETIC REASONING (AR)
50	NUMERICAL OPERATIONS (NO)
30	ATTENTION TO DETAIL (AD)
30	WORD KNOWLEDGE (WK)
15	GENERAL INFORMATION (GI)
20	MECHANICAL COMPREHENSION (MC)
20	GENERAL SCIENCE (GS)
20	SPACE PERCEPTION (SP)
20	MATHEMATICS KNOWLEDGE (MK)
30	ELECTRONICS INFORMATION (EI)

The ASVAB has proven to be an accurate measure of trainability of recruits. [Ref. 4] This, even despite the misnorming that occurred during the 1970's. Although not absolute in nature, the higher the ASVAB scores the higher the probability that the recruit will perform satisfactorily in a training environment. [Ref. 4] This thesis uses the ASVAB subtests as predictors of 'SUCCESS' beyond the training environment.

C. VARIABLE VALUE SCREENS

To precisely define our data set and insure that contamination would not affect our data, a series of variable value screens were imbedded into the program. In a sense, these screens define our cohort. The screens were determined based on what was realistic for our purposes, considering the time frame of the data base. The screens are presented in Table II.

D. VARIABLE RECODES

A series of variable recodes had to be performed in order to convert critical variables into useable form. Most conversions were from a character code to a numerical code. These are shown in Table III.

TABLE II

PROGRAM SCREENS

ENTRY AGE	GE 17 YEARS OF AGE
SEX	MALES ONLY
TOTAL PROMOTIONS	LE 5
LENGTH OF SERVICE	UNREALISTIC PERIODS WERE SCREENED OUT TO ELIMINATE THOSE WITH PRIOR SERVICE (IE. THOSE WITH GE 6 YEARS LOS)
ASVAB SUBTESTS	UNATTAINABLE SCORES WERE ELIMINATED
ASVABGI LE 15 ASVABWK LE 30 ASVABAD LE 30 ASVABNO LE 50 ASVABAR LE 20	ASVABMC LE 20 ASVABGS LE 20 ASVABSP LE 20 ASVABMK LE 20 ASVABEI LE 30
ASVAB TESTFORMS	SCREENS OUT ALL FORMS OTHER THAN THOSE IN USE DURING SEPTEMBER 1976 TO DECEMBER 1978 (ASVAB 5, 6 AND 7)
AWARDS FACTOR	LE 6
TOTAL DEMOTIONS	LE 3
TOTAL AWOL	LE 5
TOTAL DESERTIONS	LE 3
SCHOOL CODE	SCREENS OUT NUCLEAR QUALIFIED NACHINIST MATES

NOTE: GE MEANS GREATER THAN OR EQUAL TO
GT MEANS GREATER THAN
LE MEANS LESS THAN OR EQUAL TO
LT MEANS LESS THAN

TABLE III

PROGRAM RECODES

YEARS OF EDUCATION	CONVERTED FROM DMDC ORDINAL CODING (1-13) TO A RAW FIGURE. GED EQUIVALENT IS CODED AS 11.5, GIVEN LESS WEIGHT THAN A HIGH SCHOOL GRADUATE (12)
NOT RECOMMEDED FOR REENLISTMENT	NHRC CODE CHANGED FROM CHARACTER TO NUMERIC
HIGHEST PAY GRADE	NHRC CODE CHANGED FROM CHARACTER TO NUMERIC
RECRUIT PROGRAM AT ENLISTMENT	NHRC CODE CHANGED TO SEGREGATE NUCLEAR FROM NON-NUCLEAR
DAYS TO E-2, E-3, E-4	NHRC CODE CHANGED FROM CHARACTER TO NUMERIC

NOTE: DMDC MEANS DEFENSE MANPOWER DATA CENTER

E. SUMMARY

The data base provided flexibility and variety in helping develop the models shown in the next chapter. Many different combinations of variables were examined in order to determine enlistment standards for each rating. The base of access to the different files was of great assistance when conducting the analysis.

IV. ANALYSIS OF DATA

A. OVERVIEW

The primary goal of this theis is to differentiate between specific groups of individuals within each rating, such that each group represents some degree of 'SUCCESS' in the military. Based on the criteria which were used to define 'SUCCESS', an analysis was conducted to determine which predictors, if any, could help forecast how well an enlistee would be expected to perform in either the BT or MM rating.

After extracting the data for the Boiler Technicians and non-nuclear designated Machinists Mates from the entire sample, it was necessary to break these rating populations down into subgroups such that 'SUCCESSFUL' BT and 'SUCCESSFUL' MM could be differentiated from those who proved less 'SUCCESSFUL'. It was determined that time to advancement and recommended or not recommended for reenlistment were criteria which portrayed degrees of 'SUCCESS'. This determination was not reached until various other approaches were analyzed, several of which are briefly explained in this chapter.

1. Nuclear Qualified VS Non-Nuclear Qualified

Extracting the BT's and MM's from the 206229 enlistees resulted in rating groups of 5511 BT's and 5669 MM's

(non nuclear designated). We segregated the nuclear trainees from the conventional MM's because of the severe differences in training pipelines, types of duty, follow-on programs available and the higher enlistment standards required for nuclear trainees. Throughout this report, MM's refer to those Machinist Mates who were not nuclear trainees.

2. Analysis Timeframe

Since the data available account for all Navy male enlistees enlisting for active duty between October 1976 and December 1978, with historical data terminating October 1982, the longest period an enlistee could be tracked was six years, and the shortest period possible was three years and nine months. This becomes important in the following category breakdowns.

B. FIRST BREAKDOWN--NINE CATEGORIES

Our initial breakdown of subgroups included nine categories of varying levels of 'SUCCESS' for both the BT and MM ratings.

1. Criterion Variables

The initial variables utilized to define degrees of 'SUCCESS' were combinations of the qualities defined by the individual's length of service (LOS), highest paygrade achieved, and whether or not he was recommended for reenlistment by his commanding officer.

2. Breakdown

In an attempt to include all members of the BT and MM data sets, the following nine subcategories, as shown in Table IV, were established. The numerical breakdown of persons included in each of the nine categories for both ratings is given in Table V.

3. Missing Cases

The breakdown of the data left 21 BT's and 33 MM's who were unaccounted for of 5511 BT's and 5969 MM's available for analysis. A detailed search found those missing were a result of missing data (on the file tape) in the recommended/not recommended for reenlistment variable. However, due to the relative insignificance of these numbers as compared to numbers in the rating, the data for the 21 BT's and 33 MM's were discharged, and the sample sizes of 5490 and 5936 were utilized for further analysis.

C. REDEFINING THE CRITERION

Several analysis were initiated to determine significant differences among the nine subgroups, or between groupings of subgroups. In our research, we made the decision to use only explanatory variables which would be readily accessible to the recruiter. Using the variables selected we hoped to utilize data which would be definitive in predicting potential for 'SUCCESS' as defined.

TABLE IV

NINE CATEGORIES REPRESENTING LEVELS OF SUCCESS IN THE NAVY

CATEGORY	QUALITIES
1.	A. LOS GE 4 YEARS B. RECOMMENDED FOR PROMOTION C. ACHIEVED E-4 OR GREATER
2.	A. LOS BETWEEN 3 YR 9 MO AND 4 YR B. RECOMMENDED FOR RETENTION C. ACHIEVED E-4 OR GREATER
3.	A. LOS LT 3 YR 9 MO B. RECOMMENDED FOR RETENTION C. ACHIEVED E-4 OR GREATER
4.	A. LOS GT 4 YEARS B. RECOMMENDED FOR RETENTION C. ACHIEVED LESS THAN E-4
5.	A. LOS BETWEEN 3 YR 9 MO AND 4 YR B. RECOMMENDED FOR RETENTION C. ACHIEVED LESS THAN E-4
6.	A. LOS LT 3 YR 9 MO B. RECOMMENDED FOR RETENTION C. ACHIEVED LESS THAN E-4
7.	A. LOS GE 3 YR 9 MO B. NOT RECOMMENDED FOR RETENTION C. ACHIEVED LESS THAN E-4
8.	A. LOS LT 3 YR 9 MO B. NOT RECOMMENDED FOR RETENTION C. ACHIEVED LESS THAN E-4

TABLE IV (CONT)

9.		A. ACHIEVED GE E-4 B. NOT RECOMMENDED FOR RETENTION

NOTE: GE MEANS GREATER THAN OR EQUAL TO
GT MEANS GREATER THAN
LE MEANS LESS THAN OR EQUAL TO
LT MEANS LESS THAN
LOS MEANS LENGTH OF SERVICE

TABLE V

CATEGORY MEMBERSHIPS - NUMERICALLY: NUMBERS OF INDIVIDUALS

CATEGORY	BT'S	MM'S
1	2450	2969
2	669	664
3	299	503
4	389	335
5	145	96
6	385	352
7	142	104
8	839	715
9	172	198
TOTAL	5490	5936

NOTE: THE CATEGORIES ARE DEFINED IN TABLE 4.

The initial breakdown of nine categories showed very small differences among selected predictor coefficients, as developed through discriminant analysis. Probability of membership in each category is shown in Appendix Q. There were significant differences between group one and groups six, and between seven and eight, but little could be said about differences among all nine categories.

In our view, the key to 'SUCCESS' was in the enlistee's ability to complete his initial enlistment, and his being recommended or not recommended for reenlistment. The approach was taken that the key determinant in 'SUCCESS' was the recommended/not recommended for reenlistment variable, since those who didn't complete their initial enlistment will be categorized as not recommended for reenlistment. Being able to predict better those who will successfully complete their initial enlistment would be most beneficial to the recruiter.

D. SECOND BREAKDOWN--TWO CATEGORIES

Pursuing this approach, the categories were broken down into two simple groups for both ratings. The 'SUCCESSFUL' individual was defined as one recommended for reenlistment, and the 'UNDESIRABLE' was defined as one who was not recommended for reenlistment. With category one being those recommended, the number of people falling into each category for each rating is as shown in Table VI. There

TABLE VI

TWO CATEGORIES REPRESENTING SUCCESS/NONSUCCESS IN THE NAVY: DATA ARE NUMBERS OF INDIVIDUALS

	CATEGORY	BT'S	MM'S
1.	(RECOMMENDED FOR REENLISTMENT)	4337	4919
2.	(NOT RECOMMENDED FOR REENLISTMENT)	1153	1017

were 21 BT's and 33 MM's who were missing from the categories. Again, due to the relatively insignificant size of these numbers, those cases were discarded.

1. Stepwise Analysis

Using a stepwise regression analysis of the chosen predictor variables: Highest level of education, ASVABSP, ASVABNO, ASVABWK, ASVABMC, ASVABGI, ASVABAD, ASVABAR, ASVABEI, ASVABGS, ASVABMK and ENTRYAGE, the variables in Table VII were found to be significant at a level of .1000 in differentiating between the two criterion categories. The predictor variables are listed in the order by which they entered the equation.

2. Discriminant Analysis

Using these predictors, a discriminant analysis of the rating yielded the results shown in Table VIII. Linear discriminant functions provided the coefficients for the predictors. As can be seen, there was little difference in coefficient values when comparing the two categories. Further analysis provided the numbers and percent classified in each category as shown in Table IX. The table shows those individuals the model would predict to be in a specific category in relation to those who actually fell into the category. This sort of a table is sometimes called a 'HIT-MISS' table, as it shows correct classifications ('HITS') and incorrect classifications ('MISSES').

TABLE VII

KEY PREDICTORS OF SUCCESS/NONSUCCESS IN THE NAVY WHERE SUCCESS IS DEFINED AS "RECOMMENDED FOR REENLISTMENT."

	MM'S		BT'S
1.	CHYEC (YEARS OF EDUCATION)	1.	CHYEC
2.	ASVABWK	2.	ASVABWK
3.	ASVABGI	3.	ASVABMC
4.	ASVABMC	4.	ASVABMK
5.	ASVABNO	5.	ENTRYAGE
6.	ENTRYAGE		
7.	ASVABMK		
8.	ASVABAR		

NOTE: THE ASVAB PREDICTOR ACRONYMS ARE DEFINED IN TABLE I.

TABLE VIII

DISCRIMINANT COEFFICIENTS DIFFERENTIATING THOSE RECOMMENDED FOR REENLISTMENT FROM THOSE NOT RECOMMENDED FOR REENLISTMENT

BT'S

	RECOMMENDED FOR REENLISTMENT	NOT RECOMMENDED FOR REENLISTMENT
CONSTANT	-113.595	-110.705
CHYEC	12.312	12.061
ASVABAR	0.690	0.716
ASVABMC	1.132	1.184
ENTRYAGE	3.330	3.297
ASVABMK	-0.012	-0.046

MM'S

	RECOMMENDED FOR REENLISTMENT	NOT RECOMMENDED FOR REENLISTMENT
CONSTANT	-137.690	-134.908
CHYEC	15.389	15.210
ASVABGI	0.313	0.250
ASVABNO	0.342	0.330
ASVABWK	0.139	0.186
ASVABMK	-0.546	-0.575
ASVABMC	0.581	0.628
ENTRYAGE	3.859	3.794
ASVABAR	0.328	0.351

NOTE: THE ACRONYMS FOR THE PREDICTORS ARE DEFINED IN TABLES I AND VII.

In Table IX the top numbers show number of observations and the bottom numbers show what percent those numbers represent. Categories again are defined as: Category one includes those recommended for reenlistment, and category two includes those not recommended for reenlistment.

3. Interpretation of the Results in Table IX

To illustrate how the results in Table IX can be interpreted, an example of the numbers in the MM matrix of Table IX will be explained. Of the 4919 MM's who were actually in category one, the independent variables used in the model could have been utilized to accurately classify 56.39% of them. The weighted variables would have inaccurately predicted 2145 of the actual category ones by predicting that they would be category two.

4. Deficiencies in the results

The 'HIT-MISS' table in Table IX shows a predictive accuracy, or 'HIT' rate, of over 50% in both categories, but due to the extreme difference in the number of people in each category, the results are inconclusive. For example, with 4919 MM's who are actually category ones and only 1017 who are actually category two's, it would be better to predict all people who were MM's would be category ones. Using this approach, the prediction would be correct 4919/5936 = 82.8% of the time, versus the 'HIT' rate of (2774 + 585)/5936 = 56.6% from the model. (The programs utilized are listed in appendices E, F, G and H).

TABLE IX

ACCURACY OF PREDICTIONS FROM THE DISCRIMINANT FUNCTIONS DIFFERENTIATING THOSE RECOMMENDED FOR REENLISTMENT FROM THOSE NOT RECOMMENDED

MM'S

ACTUAL CATEGORY	PREDICTED CATEGORIES (1)REC	(2)NOT REC	TOTAL
(1) RECOMMENDED	2774	2145	4919
	56.39	43.61	100%
(2) NOT RECOMMENDED	432	585	1017
	42.48	57.52	100%

HIT RATE = 2774+585/5936 = 56.6% TOTAL N = 5936

BT'S

ACTUAL CATEGORY	PREDICTED CATEGORIES (1)REC	(2)NOT REC	TOTAL
(1) RECOMMENDED	2638	1699	4337
	60.83	39.17	100%
(2) NOT RECOMMENDED	554	599	1153
	48.05	51.95	100%

HIT RATE = 2638+599/5490 = 59.0% TOTAL N = 5490

As can be seen, a similar argument holds for the BT's. It was evident that what was needed were two distinct categories in each rating categories which would be approximately equal in size. In addition to being equal in size, there had to be a useful definition established for each category. In summary, what we looked for in each rating was a definitive useful-to-the-Navy split between 'SUCCESSFUL' and 'LESS SUCCESSFUL' performers, each category being of approximately equal size and encompassing the entire rating.

E. REDEFINING THE CRITERION

In an attempt to establish meaningful categories which would result in a more even split of each rating, we returned to the original nine categories defining our 'SUCCESSFUL' and 'LESS SUCCESSFUL' categories.

F. THIRD BREAKDOWN--TWO CATEGORIES

The most effective numerical breakdown which remained meaningful in terms of 'SUCCESS' in the Navy, was to group the first three categories of the original nine categories into one group and the remaining six categories into a second group. The results of this redefined 'SUCCESS' as an individual in the data set who had reached the rank of E-4 or greater and who was recommended for reenlistment. (The reader is reminded that Table IV shows and defines the original nine 'SUCCESS' categories). The category two, or 'LESS SUCCESSFUL' individuals, were all those that remained,

the original categories four through nine. The section of the Statistical Analysis System (SAS) program used to reestablish the two new categories is shown in Appendix S.

1. Stepwise Analysis

Using the two new categories, a stepwise descriminant analysis for the BT and MM ratings showed the independent variables in Table X to be the significant predictors. The corresponding coefficients are shown in Table XI. Of interest is that the top three predictors are common to both ratings. Of the significant variables for each, the only difference among the predictors is the inclusion of ASVABGI for the MM's.

2. Discriminant Analysis

Using the significant variables for each of the two ratings, a discriminant analysis was conducted which resulted in the 'HIT-MISS' or classification accuracy data shown in Table XII. Each table gives the number of observations, and the percent classified into each category.

3. Deficiencies in the Results

The tables in Table XII show the discriminant functions did not yield a useful way for predicting 'SUCCESS' in these ratings, because the 'HIT' rate in each rating was less than the accuracy that could be achieved by predicting everyone was a member of category one. Programs used are listed in Appendices I, J, K and L.

TABLE X

KEY PREDICTORS OF SUCCESS-NONSUCCESS USING THE FIRST THREE CATEGORIES FROM TABLE IV TO DEFINE SUCCESS

BT'S	MM'S
CHYEC	CHYEC
ASVABWK	ASVABNO
ASVABNO	ASVABWK
ENTRYAGE	ASVABMK
ASVABMC	ASVABMC
ASVABMK	ASVABGI
	ENTRYAGE

NOTE: VARIABLES LISTED ARE THOSE WHICH ARE SIGNIFICANT TO A LEVEL OF 0.1000. ACRONYMS ARE DEFINED IN TABLES I AND VII.

TABLE XI

DISCRIMINANT COEFFICIENTS DIFFERENTIATING CATEGORIES ONE AND TWO. CATEGORY ONE BEING THOSE WHO ADVANCE TO E-4 OR HIGHER AND WERE RECOMMENDED FOR REENLISTMENT, AND CATEGORY TWO BEING ALL OTHER. (SEE APPENDIX S).

BT'S
COEFFICIENTS

	CATEGORY ONE (E-4 OR ABOVE AND REC. FOR REEN)	CATEGORY TWO (ALL OTHERS)
CONSTANT	-119.260	-114.657
CHYEC	12.432	12.120
ASVABNO	0.344	0.333
ASVABWK	0.354	0.385
ASVABMK	-0.091	-0.123
ASVABMC	1.200	1.124
ENTRYAGE	3.318	3.251

NOTE: THE ACRONYMS FOR THE PREDCITOR VARIABLES ARE DEFINED IN TABLES I AND VII.

MM'S
COEFFICIENTS

	CATEGORY ONE (E-4 OR ABOVE AND REC. FOR REEN)	CATEGORY TWO (ALL OTHERS)
CONSTANT	-139.034	-135.116
CHYEC	15.482	15.242
ASVABNO	0.376	0.364
ASVABWK	0.148	0.185
ASVABMK	-0.384	-0.429
ASVABMC	0.637	0.676
ASVABGI	0.365	0.315
ENTRYAGE	3.901	3.850

NOTE: THE ACRONYMS FOR THE PREDICTOR VARIABLES ARE DEFINED IN TABLES I AND VII.

TABLE XII

ACCURACY OF PREDICTIONS FROM THE DISCRIMINANT FUNCTIONS WHERE SUCCESS WAS DEFINED AS ATTAINED E-4 OR HIGHER AND RECOMMENDED FOR REENLISTMENT

MM'S

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1)	2468	1668	4136
(E-4 OR GREATER AND REC FOR REEN)	59.67	40.33	100%
(2)			
(ALL OTHERS)	823	977	1800
	45.72	54.28	100%

NOTE: MISSING OBSERVATIONS = 33 TOTAL N = 5936
HIT RATE = 2468+977/5936 = 58.0%

BT'S

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1)	2210	1208	3418
(E-4 OR GREATER AND REC FOR REEN)	64.66	35.34	100%
(2)	965	1107	2072
(ALL OTHERS)	46.57	53.43	100%

NOTE: MISSING OBSERVATIONS = 21 TOTAL N = 5490
HIT RATE = 2210+1107/5490 = 60.4%

G. REDEFINING THE CRITERION

Several new approaches were tried with similar results until a new definition of 'SUCCESS' was found that successfully differentiated statistically between 'HIGHLY SUCCESSFUL' individuals and all others. This new approach was then analyzed and tested.

H. FOURTH BREAKDOWN--TWO NEW CATEGORIES

1. Criterion Variables

The new categories in each rating were as follows: category one; reached paygrade E-4 in three years or less and is recommended for reenlistment. Category two; all other personnel.

2. Predictors

Using these criteria to establish our categories the variables in Table XIII proved significant to a level of 0.1000 for each rating.

3. Discriminant Analysis

SAS programs used to do the discriminant analysis are included in Appendices M, N, O and P. Table XIV shows the accuracy of the predictions using the new model.

4. Interpretation of the Results in Table XIV

For the BT's it can be seen that by using the independent variables specified, the overall 'HIT' rate would be (1667 + 1578)/5511 = 58.9%. Of 5511 individuals who are screened, a random guess would have resulted in a correct

TABLE XIII

KEY PREDICTORS OF SUCCESS/NONSUCCESS USING THOSE WHO REACHED PAYGRADE E-4 IN THREE YEARS OR LESS AND WERE RECOMMENDED FOR REENLISTMENT.

	MM'S		BT'S
1.	CHYEC	1.	CHYEC
2.	ASVABNO	2.	ASVABMK
3.	ASVABMK	3.	ASVABNO
4.	ASVABWK	4.	ENTRYAGE
5.	ASVABGI	5.	ASVABWK
6.	ENTRYAGE	6.	ASVABGI

NOTE: ACRONYMS FOR PREDICTOR VARIABLES ARE DEFINED IN TABLES I AND VII.

TABLE XIV

ACCURACY OF PREDICTIONS FOR THE BT'S WHEN SUCCESS HAS DEFINED AS ACHIEVING PAYGRADE E-4 IN THREE YEARS OR LESS AND WAS RECOMMENDED FOR REENLISTMENT.

BT'S

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1)	1667	934	2601
(ACHIEVED PAYGRADE E-4 IN 3 YEARS OR LESS AND IS REC FOR REEN)	64.09	35.91	100%
(2)	1332	1578	2910
(ALL OTHERS)	45.77	54.23	100%

NOTE: THERE ARE NO MISSING OBSERVATIONS TOTAL N = 5511
HIT RATE = 1667+1578/5511 = 58.9%

categorization of only 52.8%, (2910/5511), for category two individuals. For the MM's the results are less conclusive, but nonetheless they are improved over the previous models. Table XV shows the predictions for the MM's.

5. Interpretation of the Results in Table XV

For category ones, in the MM rating the independent variables utilized in the categorization can be used to accurately predict a category one individual 61.16% of the time. Of a random group of 5969 MM's, a pure guess would result in a 56.2% chance of being correct that the individual would be classified in category one.

6. Model Validation

To test the validity of the model utilizing the predictors listed in Table XIII, a cross-validation was conducted to test the model. Each rating was broken into two random groups and the model was then run on these two groups. In establishing the two groups within each rating a random variate with zero mean and a standard deviation of 1.0 was assigned to each case in the entire sample. Those cases which had an absolute value in the range 0 to 1.0 (approximately 67% of those in the rating) were used to weight the predictors, and the remaining 33% were used to determine if results with useful accuracy would be obtained from using the discriminant function.

To compare the results, the 'HIT-MISS' matrix was again utilized, and 'HIT' percentages compared. Useful

TABLE XV

ACCURACY OF PREDICTIONS FOR THE MM'S WHEN SUCCESS WAS DEFINED AS ACHIEVING PAYGRADE E-4 IN THREE YEARS OR LESS AND WAS RECOMMENDED FOR REENLISTMENT

MM'S

ACTUAL CATEGORIES	PREDICTED CATEGORES (1)	(2)	TOTAL
(1)	2050	1302	3352
(ACHIEVED PAYGRADE E-4 IN 3 YEARS OR LESS AND IS REC FOR REEN)	61.16	38.84	100%
(2)	1204	1413	2617
(ALL OTHERS)	46.01	53.99	100%

NOTE: THERE ARE NO MISSING OBSERVATIONS TOTAL N = 5969
HIT RATE = 2050+1413/5969 = 58.0%

'HIT' rates in the cross-validation sample for each rating would indicate that the predictors used were valid. The resulting matrices are shown in Tables XVI and XVII.

As can be seen, in both ratings the 'HIT' rates are consistent as are the percentages of 'HITS' for each category, indicating that the model is valid and the assigned predictors, can be utilized to predict with some accuracy an individuals potential in either BT or MM rating.

TABLE XVI

CROSS VALIDATION TO TEST CONSISTENCY OF MODEL AS APPLIED TO BT'S WHEN SUCCESS WAS DEFINED AS ACHIEVING PAYGRADE E-4 IN THREE YEARS OR LESS AND WAS RECOMMENDED FOR REENLISTMENT

BT'S

GROUP ONE: DEVELOPMENTAL SAMPLE

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1) (ACHIEVED PAYGRADE E-4 IN 3 YEARS OR LESS IS REC FOR REEN)	1143 65.35	606 34.65	1749 100%
(2) (ALL OTHERS)	918 47.20	1027 52.80	1945 100%

HIT RATE = 1143+1027/3694 = 58.7% TOTAL N = 3694

GROUP TWO: CROSS VALIDATION SAMPLE

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1) (ACHIEVED PAYGRADE E-4 IN 3 YEARS OR LESS AND IS REC FOR REEN)	555 65.14	297 34.86	852 100%
(2) (ALL OTHERS)	445 46.11	520 53.89	965 100%

HIT RATE = 555+520/1817 = 59.2% TOTAL N = 1817

TABLE XVII

CROSS VALIDATION TO TEST CONSISTENCY OF MODEL AS APPLIED TO MM'S WHEN SUCCESS WAS DEFINED AS ACHIEVING PAYGRADE E-4 IN THREE YEARS OR LESS AND WAS RECOMMENDED FOR REENLISTMENT

MM'S

GROUP ONE: DEVELOPMENT GROUP

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1) (ACHIEVED PAYGRADE E-4 IN 3 YEARS OR LESS AND IS REC FOR REEN)	1392 61.59	868 38.41	2260 100%
(2) (ALL OTHERS)	867 47.33	965 52.67	1832 100%

HIT RATE = 1392+965/4092 = 57.6% TOTAL N = 4092

GROUP TWO: CROSS VALIDATION SAMPLE

ACTUAL CATEGORIES	PREDICTED CATEGORIES (1)	(2)	TOTAL
(1) (ACHIEVED PAYGRADE E4 IN 3 YEARS OR LESS AND IS REC FOR REEN)	661 60.53	431 39.47	1092 100%
(2) (ALL OTHERS)	336 42.80	449 57.20	785 100%

HIT RATE = 661+449/1877 = 59.1% TOTAL N = 1877

V. CONCLUSIONS AND RECOMMENDATIONS

A. PREDICTING SUCCESS

The purpose of this research has been to provide to the recruiter a useable guideline when working with individuals to help predict their chances of 'SUCCESS' in two Navy ratings. There are several trends or consistencies which came to light during the research which may assist recruiters in personnel placement.

1. The Sailor with no Preference

One approach is to consider the individual who is interested in a mechanical rating, but who has no strong preference between the BT or MM rating. Of interest is the fact that, of the individuals who advanced to E-4 in three years or less and were recommended for reenlistment, the MM's mean value for all predictor variables were higher than the means for the BT's.

Even though ASVABNO and ASVABMK were both in the top three discriminating variables for each rating, the difference between those scores for the two ratings was statistically significant. A recruiter may want to review closely the scores of these two ASVAB subtests for a recruit who desires either rating, but indicates no preference.

Normalized mean scores and the comparison of these scores are shown in Table XVIII.

TABLE XVIII

NORMALIZED MEAN VALUES OF PREDICTOR VARIABLES FOR THOSE INDIVIDUALS IN THE BT AND MM RATINGS WHO ADVANCED TO E-4 IN THREE YEARS OR LESS AND WERE RECOMMENDED FOR REENLISTMENT. DIFFERENCES IN THE MEAN VALUES ARE SHOWN IN THE FAR RIGHT COLUMN.

MM'S	PREDICTOR VARIABLE	BT'S	DIFFERENCE
11.82	HIGHEST YEAR OF EDUCATION	11.68	.14
10.41	ASVABGI	10.32	.09
32.08	ASVABNO	31.29	.79
14.49	ASVABAD	14.43	.06
20.86	ASVABWK	20.60	.26
13.27	ASVABAR	12.95	.32
13.28	ASVABSP	13.11	.17
12.11	ASVABMK	11.51	.60
21.05	ASVABEI	20.82	.23
12.29	ASVABMC	12.25	.04
11.96	ASVABGS	11.69	.27
18.98	ENTRYAGE	18.93	.05

NOTE: FOR EACH VARIABLE THE MM'S VALUE IS HIGHER THAN THAT FOR THE BT'S

2. The Recruit who wants to be a Propulsion Engineer

The second approach to using the model, is in predicting the 'SUCCESS' of an individual who is headed for either the BT or MM rating. Highest year of education plays the primary part in predicting 'SUCCESS' as defined for both ratings, and the higher the level of education, the greater the chance of 'SUCCESS'. Table XIII illustrates this, as CHYEC, highest year of education, was the first variable to be inserted in the regression equation. This finding concurs with those of Fletcher (CNA 1979), and many other studies, that concluded that educational accomplishment is associated with an improved chance of survival during the initial enlistment.

The key ASVAB subtest which differentiates between 'SUCCESSFUL' and less 'SUCCESSFUL' individuals in both the BT and MM ratings is the numerical operations ASVAB subtest. As seen in Table XIX, the ASVABNO has the greatest difference between mean scores for category one and category two individuals for both ratings.

Individuals who do poorly on the ASVABNO subtest, relative to the category one means for the BT's and MM's analyzed, may not be suited for either rating. The recruiter may wish to further evaluate the recruits potential before assigning that individual to a specific rating pipeline. Also worthy of note, is the case where the 'LESS SUCCESSFUL' BT's, the category twos, had higher mean scores on both the

TABLE XIX

PREDICTOR MEANS FOR CATEGORY ONE AND CATEGORY TWO INDIVIDUALS FOR THE MM AND BT RATINGS. DIFFERENCES, CATEGORY ONE MINUS CATEGORY TWO VALUES, ARE LISTED IN THE RIGHT HAND COLUMN.

BT'S

PREDICTORS	CAT 1 MEAN	CAT 2 MEAN	DIFFERENCE (1-2=?)
EDUCATION	11.67	11.38	0.29
ASVABNO	31.29	29.83	1.46
ASVABWK	20.60	20.66	(MINUS) 0.06
ASVABSP	13.12	13.13	(MINUS) 0.01
ASVABMK	11.51	10.78	0.73
ASVABGI	10.32	10.09	0.23
ASVABAD	14.43	14.23	0.20
ASVABMC	12.25	12.10	0.15
ENTRYAGE	18.93	18.58	0.35
ASVABGS	11.69	11.60	0.09
ASVABEI	20.82	20.63	0.19
ASVABAR	12.95	12.44	0.51

MM'S

EDUCATION	11.82	11.59	0.23
ASVABGI	10.41	9.99	0.42
ASVABNO	32.08	30.28	1.80
ASVABAD	14.49	14.18	0.31
ASVABWK	20.86	20.61	0.25
ASVABAR	13.27	12.63	0.64
ASVABSP	13.28	13.18	0.10
ASVABMK	12.11	11.17	0.94
ASVABEI	21.05	20.65	0.40
ASVABMC	12.29	12.04	0.25
ASVABGS	11.96	11.58	0.38
ENTRYAGE	18.98	18.74	0.24

NOTE: (CATEGORY ONE INDIVIDUALS ARE THOSE WHO ADVANCED TO E-4 IN 3 YEARS OR LESS AND ARE RECOMMENDED FOR REENLISTMENT, CATEGORY TWO INCLUDES ALL OTHERS)

ASVABWK and the ASVABSP subtests than did 'SUCCESSFUL' BT's. Individuals scoring higher on these subtests than did the category one BT's, may be better suited for another rating.

3. Use of the ASVAB

Historically, Navy recruiters have used only shop related and mathematical knowledge subtests when screening recruits for eligibility to attend BT and MM 'A' schools. Not that all the answers lay with the thesis subtests, but the authors feel strongly that the complete span of subtests should be considered when selecting a recruit for the MM or BT rating. A complete analysis of all ratings would be necessary to determine specifically which subtests apply to which ratings.

4. MM and BT Differences-Few but Predictable

The purpose of this thesis was to search for and determine if, by using the selected independent variables, the recruiter could predict 'SUCCESS' in the BT and MM ratings. The answer is yes, but improvements over current limits of accuracy of predictions are small.

B. SUGGESTIONS FOR FURTHER RESEARCH

This thesis has only scratched the surface in an area that shows promise for predicting 'SUCCESS' and placing an enlistee in the proper rating. To be useful to the recruiter, continued study of other ratings and further analysis of the BT and MM communities is highly recommended.

Defining the criterion of 'SUCCESS' was extremely difficult and very subjective. We recommend a detailed study be done on this issue, in the hope of developing an acceptable method useful to the Navy and its recruiters.

APPENDIX A

STEPWISE REGRESSION USING NINE BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W.L. SNYDER', CLASS = C
// EXEC SAS
// FILEIN DD DISP = SHR, DSN = MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS = 75 NODATE;
DATA; SET FILE IN.WILBAH;
              IF HYEC=1 THEN CHYEC=3.5;
              IF HYEC=2 THEN CHYEC=8;
              IF HYEC=3 THEN CHYEC=9;
              IF HYEC=4 THEN CHYEC=10;
              IF HYEC=5 THEN CHYEC=11;
              IF HYEC=6 THEN CHYEC=12;
              IF HYEC=7 THEN CHYEC=13;
              IF HYEC=8 THEN CHYEC=14;
              IF HYEC=9 THEN CHYEC=15;
              IF HYEC=10 THEN CHYEC=16;
              IF HYEC=11 THEN CHYEC=18;
              IF HYEC=12 THEN CHYEC=20;
              IF HYEC=13 THEN CHYEC=11.5;
              HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
```

```
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=8;
    IF ((NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=9;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
          CHYEC ASVABNO ASVABWK ASVABSP ASVABMK ASVABGI ASVABAD
          ASVABMC ENTRYAGE ASVABGS ASVABEI ASVABAR;
CLASS CATEGORY;
/*
//
```

APPENDIX B

DISCRIMINANT ANALYSIS FOR NINE BT CATEGORIES

```
//FILE IN DD DISP=SHR, DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY 2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY 6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=8;
```

```
    IF ((NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=9;
PROC DISCRIM;VAR
           CHYEC ASVABNO ASVABWK ASVABG1 ASVABMK
           ASVABMC ENTRYAGE;
CLASS CATEGORY;
/*
//
```

APPENDIX C

STEPWISE REGRESSION FOR NINE MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
           IF HYEC=1 THEN CHYEC=3.5;
           IF HYEC=2 THEN CHYEC=8;
           IF HYEC=3 THEN CHYEC=9;
           IF HYEC=4 THEN CHYEC=10;
           IF HYEC=5 THEN CHYEC=11;
           IF HYEC=6 THEN CHYEC=12;
           IF HYEC=7 THEN CHYEC=13;
           IF HYEC=8 THEN CHYEC=14;
           IF HYEC=9 THEN CHYEC=15;
           IF HYEC=10 THEN CHYEC=16;
           IF HYEC=11 THEN CHYEC=18;
           IF HYEC=12 THEN CHYEC=20;
           IF HYEC=13 THEN CHYEC=11.5;
           HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
```

```
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=8;
    IF ((NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=9;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
CHYEC ASVABGI ASVABNO ASVABAD ASVABWK ASVABAR ASVABSP ASVABMK
      ASVABEI ASVABMC ASVABGS ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX D

DISCRIMINANT ANALYSIS FOR NINE MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W.A. BERGAZZI', CLASS=C
// EXEC SAS
// FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
```

```
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=8;
    IF ((NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=9;
PROC DISCRIM;VAR
CHYEC ASVABGI ASVABNO ASVABWK ASVABMK
      ASVABMC ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX E

STEPWISE REGRESSION FOR TWO BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W.L. SNYDER', CLASS=C
//EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF (NOTRCMD EQ 0) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
        CHYEC ASVABNO ASVABWK ASVABSP ASVABMK ASVABGI ASVABAD
              ASVABMC ENTRYAGE ASVABGS ASVABEI ASVABAR;
  CLASS CATEGORY;
/*
//
```

APPENDIX F

DISCRIMINANT ANALYSIS FOR TWO BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W.L. SNYDER', CLASS=C
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
           HYEC=CHYEC;
IF (NOTRCMD EQ 0) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC DISCRIM;VAR
         CHYEC ASVABNO ASVABWK ASVABMK ASVABGI
         ENTRYAGE ASVABAR;
  CLASS CATEGORY;
/*
//
```

APPENDIX G

STEPWISE REGRESSION FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD*
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC
IF (NOTRCMD EQ 0) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
CHYEC ASVABGI ASVABNO ASVABAD ASVABWK ASVABAR ASVABSP ASVABMK
      ASVABEI ASVABMC ASVABGS ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX H

DISCRIMINANT ANALYSIS FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W.A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN:
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF (NOTRCMD EQ 0) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC DISCRIM;VAR
CHYEC ASVABGI ASVABNO ASVABAD ASVABWK ASVABMK
      ASVABMC;
  CLASS CATEGORY;
/*
//
```

APPENDIX I

STEPWISE REGRESSION FOR TWO BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W.L. SNYDER', CLASS=C
//EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
           HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY 5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=8;
```

```
    IF ((NOTRCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=9;
IF CATEGORY=1 THEN CATEGORY=1;
IF CATEGORY=2 THEN CATEGORY=1;
IF CATEGORY=3 THEN CATEGORY=1;
IF CATEGORY=4 THEN CATEGORY=2;
IF CATEGORY=5 THEN CATEGORY=2;
IF CATEGORY=6 THEN CATEGORY=2;
IF CATEGORY=7 THEN CATEGORY=2;
IF CATEGORY=8 THEN CATEGORY=2;
IF CATEGORY=9 THEN CATEGORY=2;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
        CHYEC ASVABNO ASVABWK ASVABSP ASVABMK ASVABGI ASVABAD
              ASVABMC ENTRYAGE ASVABGS ASVABEI ASVABAR;
  CLASS CATEGORY;
/*
//
```

APPENDIX J

DISCRIMINANT ANALYSIS FOR TWO BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W. L. SNYDER', CLASS=C
//EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD*
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ 0) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
    IF ((LNGTHSRV LE 0309) AND
       (NOTRCMD EQ 1) AND
```

```
        (NUHYPAY LT 4)) THEN CATEGORY=8;
     IF ((NOTRCMD EQ 1) AND
        (NUHYPAY GE 4)) THEN CATEGORY=9;
IF CATEGORY=1 THEN CATEGORY=1;
IF CATEGORY=2 THEN CATEGORY=1;
IF CATEGORY=3 THEN CATEGORY=1;
IF CATEGORY=4 THEN CATEGORY=2;
IF CATEGORY=5 THEN CATEGORY=2;
IF CATEGORY=6 THEN CATEGORY=2;
IF CATEGORY=7 THEN CATEGORY=2;
IF CATEGORY=8 THEN CATEGORY=2;
IF CATEGORY=9 THEN CATEGORY=2;
PROC DISCRIM;VAR
        CHYEC ASVABNO ASVABWK ASVABSP ASVABMK
              ASVABMC ENTRYAGE ASVABAR
  CLASS CATEGORY;
/*
//
```

APPENDIX K

STEPWISE REGRESSION FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732/0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR, DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOT RCMD EQ 1) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
```

```
     IF ((LNGTHSRV LE 0309) AND
        (NOTRCMD EQ 1) AND
        (NUHYPAY LT 4)) THEN CATEGORY=9;
     IF ((NOTRCMD EQ 1) AND
        (NUHYPAY GE 4)) THEN CATEGORY=9;
IF CATEGORY=1 THEN CATEGORY=1;
IF CATEGORY=2 THEN CATEGORY=1;
IF CATEGORY=3 THEN CATEGORY=1;
IF CATEGORY=4 THEN CATEGORY=2;
IF CATEGORY=5 THEN CATEGORY=2;
IF CATEGORY=6 THEN CATEGORY=2;
IF CATEGORY=7 THEN CATEGORY=2;
IF CATEGORY=8 THEN CATEGORY=2;
IF CATEGORY=9 THEN CATEGORY=2;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
CHYEC ASVABGI ASVABNO ASVABAD ASVABWK ASVABAR ASVABSP ASVABMK
      ASVABEI ASVABMC ASVABGS ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX L

DISCRIMINANT ANALYSIS FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
    IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=1;
    IF ((LNGTHSRV LT 0400) AND
       (LNGTHSRV GE 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=2;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY GE 4)) THEN CATEGORY=3;
    IF ((LNGTHSRV GE 0400) AND
       (NOTRCDM EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=4;
    IF ((LNGTHSRV GE 0309) AND
       (LNGTHSRV LT 0400) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=5;
    IF ((LNGTHSRV LT 0309) AND
       (NOTRCMD EQ O) AND
       (NUHYPAY LT 4)) THEN CATEGORY=6;
    IF ((LNGTHSRV GT 0309) AND
       (NOTRCMD EQ 1) AND
       (NUHYPAY LT 4)) THEN CATEGORY=7;
```

```
     IF ((LNGTHSRV LE 0309) AND
        (NOTRCMD EQ 1) AND
        (NUHYPAY LT 4)) THEN CATEGORY=8;
     IF ((NOTRCMD EQ 1) AND
        (NUHYPAY GE 4)) THEN CATEGORY=9;
IF CATEGORY=1 THEN CATEGORY=1;
IF CATEGORY=2 THEN CATEGORY=1;
IF CATEGORY=3 THEN CATEGORY=1;
IF CATEGORY=4 THEN CATEGORY=2;
IF CATEGORY=5 THEN CATEGORY=2;
IF CATEGORY=6 THEN CATEGORY=2;
IF CATEGORY=7 THEN CATEGORY=2;
IF CATEGORY=8 THEN CATEGORY=2;
IF CATEGORY=9 THEN CATEGORY=2;
PROC DISCRIM;VAR
CHYEC ASVABGI ASVABNO ASVABWK ASVABMK
      ASVABMC ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX M

STEPWISE REGRESSION FOR TWO BT CATEGORIES

```
//SNYDFINL JOB (1195,0171), 'W. L. SNYDER', CLASS=C
//EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF ((NDAYSE4 LE 1095) AND (NOTRCMD EQ 0)) THEN CATEGORY=1;
 ELSE CATEGORY=2
PROC STEPDISC SIMPLE STDMEAN TCORR;VAR
        CHYEC ASVABNO ASVABWK ASVABSP ASVABMK ASVABGI ASVABAD
              ASVABMC ENTRYAGE ASVABGS ASVABEI ASVABAR;
  CLASS CATEGORY;
/*
//
```

APPENDIX N

DISCRIMINANT ANALYSIS FOR TWO BT CATEGORIES

```
//SNYDER9X JOB (1195,0171), 'W. L. SNYDER', CLASS=C
//EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S1195.WILBAH
//SYSIN DD *
OPTIONS NOCENTER LS=75 NODATE;
DATA; SET FILE IN.WILBAH
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF ((NDAYDE4 LE 1095) AND (NOTRCMD EQ 0)) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC DISCRIM;VAR
        CHYEC ASVABWK ASVABMK ASVABGI ASVABAR
              ENTRYAGE ASVABNO;
  CLASS CATEGORY;
/*
//
```

APPENDIX O

STEPWISE REGRESSION FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF ((NOTRCMD EQ 0) AND (NDAYDE4 LE 1095)) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC STEPDISC SIMPLE STDMEAN TCORR WCORR;VAR
        CHYEC ASVABGI ASVABNO ASVABAD ASVABWK ASVABAR ASVABSP
              ASVABMK ASVABEI ASVABMC ASVABGS ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX P

DISCRIMINANT ANALYSIS FOR TWO MM CATEGORIES

```
//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.NNMM09
//SYSIN DD *
DATA; SET FILE IN.NNNN;
            IF HYEC=1 THEN CHYEC=3.5;
            IF HYEC=2 THEN CHYEC=8;
            IF HYEC=3 THEN CHYEC=9;
            IF HYEC=4 THEN CHYEC=10;
            IF HYEC=5 THEN CHYEC=11;
            IF HYEC=6 THEN CHYEC=12;
            IF HYEC=7 THEN CHYEC=13;
            IF HYEC=8 THEN CHYEC=14;
            IF HYEC=9 THEN CHYEC=15;
            IF HYEC=10 THEN CHYEC=16;
            IF HYEC=11 THEN CHYEC=18;
            IF HYEC=12 THEN CHYEC=20;
            IF HYEC=13 THEN CHYEC=11.5;
            HYEC=CHYEC;
IF ((NOTRCMD EQ 0) AND (NDAYS E4 LE 1095)) THEN CATEGORY=1;
 ELSE CATEGORY=2;
PROC DISCRIM;VAR
        CHYEC ASVABGI ASVABNO ASVABWK ASVABMI
              ENTRYAGE;
  CLASS CATEGORY;
/*
//
```

APPENDIX Q

MATRIX OF OBSERVATIONS AND PERCENTS OF NINE BT CATEGORIES

RESULTS OF AN INITIAL DISCRIMINANT ANALYSIS

NUMBER OF OBSERVATIONS AND PERCENTS CLASSIFIED INTO CATEGORY:

ACTUAL CATEGORIES	PREDICTED CATEGORIES 1	2	3	4	5	6	7	8	9	TOTAL
.	0	2	11	2	0	2	3	1	0	21
	0.00	9.52	52.38	9.52	0.00	9.52	14.29	4.76	0.00	100.00
1	141	403	566	286	162	65	422	93	312	2450
	5.76	16.45	23.10	11.67	6.61	2.65	17.22	3.80	12.73	100.00
2	39	131	158	72	38	11	93	28	99	669
	5.83	19.58	23.62	10.76	5.68	1.64	13.90	4.19	14.80	100.00
3	12	42	111	34	18	6	36	10	30	299
	4.01	14.05	37.12	11.37	6.02	2.01	12.04	3.34	10.03	100.00
4	21	41	63	66	46	7	82	17	46	389
	5.40	10.54	16.20	16.97	11.83	1.80	21.08	4.37	11.83	100.00
5	8	12	17	13	25	4	40	7	19	145
	5.52	8.28	11.72	8.97	17.24	2.76	27.59	4.83	13.10	100.00
6	18	43	79	61	45	6	80	18	35	385
	4.68	11.17	20.52	15.84	11.69	1.56	20.78	4.68	9.09	100.00
7	4	15	16	17	22	0	45	8	15	142
	2.82	10.56	11.27	11.97	15.49	0.00	31.69	5.63	10.56	100.00

8	35	101	114	95	88	20	226	40	120	839
	4.17	12.04	13.59	11.32	10.49	2.38	26.94	4.77	14.30	100.00
9	5	32	27	15	17	5	31	7	33	172
	2.91	18.60	15.70	8.72	9.88	2.91	18.02	4.07	19.19	100.00
TOTAL	283	822	1162	661	461	126	1058	229	709	5511
PERCENT	5.14	14.92	21.09	11.99	8.37	2.29	19.20	4.16	12.87	100.00
PRIOR PROBABILITIES	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	0.1111	

APPENDIX R

PROGRAM SEGREGATING NUCLEAR AND NON-NUCLEAR MM'S

```
FILE:  NONNUC SASCNTL A1 NAVAL POSTGRADUATE SCHOOL

//BERGAZZI JOB (2732,0171), 'W. A. BERGAZZI', CLASS=C
//*MAIN ORG=NPGVM1.2732P
// EXEC SAS
//FILE IN DD DISP=SHR,DSN=MSS.S2732.MIDMM9
//FILE OUT DD UNIT=3330V,MSVGP=PUB4A,DISP=(NEW CATLG),
//       DSN=MSS.S2732.NNMM09,
         DCB=(BLKSIZE=6400)
//SYSIN DD *
OPTIONS ERRORS=0 LS=80;
DATA; SET FILE IN.MIDMM9;
      IF ((RECPRGSC GE 23) AND (RECPRGSC LE 3()) THEN NF=1;
      ELSE NF=0;
DATA FILE OUT.NNNN; SET DATA1;IF NF=0;
DATA;SET DATA1;IF NF=1;
PROC FREQ DATA=DATA2;
TABLES DMDCRATE RCPGSCRT PRRTABRV EXAMRATE;
/*
//
```

APPENDIX S

THIRD BREAKDOWN--TWO CATEGORY RECODE

```
IF ((LNGTHSRV GE 0400) AND (NOTRCMD EQ O) AND
   (NUHYPAY GE 4)) THEN CATEGORY=1
IF ((LNGTHSRV LT 0400) AND
   (LNGTHSRV GE 0309) AND
   (NOTRCMD EQ O) AND
   (NUHYPAY GE 4)) THEN CATEGORY=2;
IF ((LNGTHSRV LT 0309) AND
   (NOTRCMD EQ O) AND
   (NUHYPAY GE 4)) THEN CATEGORY=3;
IF ((LNGTHSRV GE 0400) AND
   (NOTRCMD EQ O) AND
   (NUHYPAY LT 4)) THEN CATEGORY=4;
IF ((LNGTHSRV GE 0309) AND
   (NOTRCMD EQ O) AND
   (NUHYPAY LT 4)) THEN CATEGORY=5;
IF ((LNGTHSRV LT 0309) AND
   (NOTRCDM EQ O) AND
   (NUHYPAY LT 4)) THEN CATEGORY=6;
IF ((LNGTHSRV GT 0309) AND
   (NOTRCMD EQ 1) AND
   (NUHYPAY LT 4)) THEN CATEGORY=7;
IF ((LNGTHSRV LE 0309) AND
   (NOTRCMD EQ 1) AND
   (NUHYPAY LT 4)) THEN CATEGORY=8;
IF ((NOTRCMD EQ 1) AND
   (NUHYPAY GE 4)) THEN CATEGORY=9;
IF CATEGORY=1 THEN CATEGORY=1
IF CATEGORY=2 THEN CATEGORY=1
IF CATEGORY=3 THEN CATEGORY=1
IF CATEGORY=4 THEN CATEGORY=2
IF CATEGORY=5 THEN CATEGORY=2
IF CATEGORY=6 THEN CATEGORY=2
IF CATEGORY=7 THEN CATEGORY=2
IF CATEGORY=8 THEN CATEGORY=2
IF CATEGORY=9 THEN CATEGORY=2
NOTE:  LNGTHSRV (LENGTH OF SERVICE) IS GIVEN AS YEARS AND
       MONTHS.
EXAMPLE:  0309 REPRESENTS THREE YEARS NINE MONTHS.
NUHYPAY (HIGHEST PAYGRADE ACHIEVED).
NOTRCMD (NOT RECOMMENDED FOR REENLISTMENT) IF ONE,
THEN INDIVIDUAL IS NOT RECOMMENDED, IF ZERO, THEN INDIVIDUAL
IS RECOMMENDED FOR REENLISTMENT.
```

REFERENCES

1. Personnel Statistics Office, Quarterly Report, Navy Military Personnel Statisics--NAVPERS 15658, Washington, D.C., Naval Military Personnel Command, 31 December 1982.

2. Phone Conversation with Les Willis, Defense Manpower Data Center (DMDC), Monterey, California, 10 March 1983.

3. Office of the Assistant Secretary of Defense, (Manpower, Reserve Affairs and Logistics), Aptitude Testing of Recruits, Washington, D.C., Department of Defense, July 1980.

4. Office of the Assistant Secretary of Defense, (Manpower, Reserve Affairs and Logistics), Profile of American Youth, Washington, D.C., Department of Defense, March 1982.

BIBLIOGRAPHY

ASVAB Working Groups, History of the ASVAB: A Report to the Principal Deputy Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), Washington D.C., Office of the Secretary of Defense, March 1980.

Defense Advisory Committee on Military Personnel Testing, Development and Calibration of the ASVAB Forms 8, 9 and 10, Washington, D.C., Office of the Assistant Secretary of Defense (Manpower, Reserve Affairs and Logistics), 29-30 June 1981.

Fletcher, J. W., Estimating Four-Year Survival and Reenlistment Probabilities for Boiler Technicians and Machinist's Mates, Alexandria, Virginia, Center for Naval Analyses, February 1979.

Griffin, P., A First Term Attrition Severity Index for U.S. Navy Ratings, Master's Thesis, Naval Postgraduate School, Monterey, California, June 1981.

Hawkins, C.D. (Captain USN), The Navy Enlisted Career Guide 1980 - 1981, Washington, D.C., The Navy Recruiting Command 1 May 1980.

Horowitz, Stanley A. and Sherman, A., (CDR USN), Crew Characteristics and Ship Conditions, (Maintenance Personnel Effectiveness Study), Alexandria, Virginia, Center for Naval Analyses, March 1977.

Lurie, P. M., Continuous Estimates of Survival Through Eight Years of Service Using FY 1979 Cross Sectional Data, Alexandria, Virginia, Center for Naval Analyses, September 1979.

Lurie, P. M., Non-Parametric Methods for Estimating Recruit Survival with Cross Sectional Data, Alexandria, Virginia, Center for Naval Analyses, September 1979.

Lurie, P. M. and Lockman, R. F., A New Look at Success Chances of Recruits Entering the Navy (SCREEN), Alexandria, Virginia, Center for Naval Analyses, February 1980.

Lurie, P. M., Two-Term Survival of Female Personnel, Alexandria, Virginia, Center for Naval Analyses, February 1982.

Office of the Assistant Secretary of Defense, (Manpower, Reserve Affairs and Logistics), Implementation of New ASVAB and Actions to Improve the Enlistment Standards Process, Washington, D.C., Department of Defense, 31 December 1980.

Sands, W. A., Screening Male Applicants for Navy Enlistment, San Diego, California, Navy Personnel Research and Development Center, June 1977.

Thomason, J. S., First Term Survival and Reenlistment Chances for Navy Ratings and a Strategy for their Use, Alexandria, Virginia, Center for Naval Analyses, May 1979.

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